

LISTING OF THE CLAIMS:

Claim 1 (Previously Presented): Process for the production of a mixture comprising hydrogen and CO, comprising partially oxidizing a hydrocarbon by an oxygenated medium or a medium capable of releasing oxygen, wherein the process is carried out under autothermal conditions, the heat given off by said oxidation being recovered to maintain the endothermic reactions which take place between a nonoxidized fraction of said hydrocarbon and CO₂ and steam produced by said oxidation, wherein

a reaction gas mixture comprising the hydrocarbon and the oxygenated medium or medium capable of releasing oxygen, is introduced into a porous medium which has been preheated beforehand, and wherein

the introduction of the reaction gas mixture into the porous medium results in heating the reaction gas mixture by heat exchange with the porous medium to a temperature sufficient to initiate a combustion reaction,

wherein said preheated porous medium is formed by a first inert porous material and wherein the reaction gas mixture or a product thereof successively encounters said first inert porous material, a catalytic bed and then a second inert porous material within a vertical cylindrical reactor, the ends of which are filled with one or other of said inert porous materials and the central part of which is filled with said catalytic bed, and

alternately feeding the reactor with the reaction gas mixture by the following introduction modes (i) and (ii):

(i) the reaction gas mixture is introduced to a lower part of the reactor and the mixture comprising the hydrogen and the CO is collected at an upper part of the reactor, or

(ii) the reaction gas mixture is introduced to the upper part of the reactor and the mixture comprising the hydrogen and the CO is collected at the lower part of the reactor,

wherein the introduction modes (i) and (ii) alternate as a function of the advance of a combustion front inside the reactor.

Claim 2 (Canceled)

Claim 3 (Previously Presented): Process according to Claim 1, wherein said first and second inert porous materials are identical.

Claim 4 (Canceled)

Claim 5 (Previously Presented): Process according to Claim 1, wherein the preheating of said porous medium is carried out using electrical elements situated at the periphery of the reactor.

Claim 6 (Previously Presented): Process according to Claim 1, wherein the preheating of said porous medium is carried out by circulating therein, prior to said introduction of the reaction mixture, a preheating gas mixture comprising a hydrocarbon and oxygen in proportions for achieving total combustion.

Claim 7 (Previously Presented): Process according to Claim 1, wherein said reaction gas mixture or a product thereof successively encounters said first inert porous material, said catalytic bed and said second inert porous material within a reactor comprising the following arrangement:

- a first cylinder comprising, at its lower end, means for introducing said reaction gas mixture;
- a second cylinder of smaller diameter than said first cylinder, inserted into said first cylinder so that its upper end is situated at a distance from the upper end of the first cylinder and so that its lower end, via which the mixture comprising the hydrogen and the CO is collected, emerges outside the first cylinder;
- said first inert porous material filling at least a portion of the height of the annular space defined by the internal wall of the first cylinder and the external wall of the second cylinder;
- said catalytic bed filling the upper part of the first cylinder and/or that of the second cylinder;
- said second inert porous material filling the lower part of the second cylinder.

Claim 8 (Previously Presented): Process according to Claim 7, wherein the preheating of said porous medium is carried out using electrical elements situated at the periphery of the reactor.

Claim 9 (Previously Presented): Process according to Claim 7, wherein the preheating of said porous medium is carried out by circulating therein, prior to said introduction of the reaction mixture, a preheating gas mixture comprising a hydrocarbon and oxygen in proportions for achieving total combustion.

Claim 10 (Canceled)

Claim 11 (Previously Presented): Process according to Claim 1, wherein the preheating of said porous medium is carried out using electrical elements situated at the periphery of the reactor.

Claim 12 (Previously Presented): Process according to Claim 3, wherein the preheating of said porous medium is carried out using electrical elements situated at the periphery of the reactor.

Claim 13 (Previously Presented): Process according to Claim 1, wherein the preheating of said porous medium is carried out by circulating therein, prior to said introduction of the reaction mixture, a preheating gas mixture comprising a hydrocarbon and oxygen in proportions for achieving total combustion.

Claim 14 (Previously Presented): Process according to Claim 3, wherein the preheating of said porous medium is carried out by circulating therein, prior to said introduction of the reaction mixture, a preheating gas mixture comprising a hydrocarbon and oxygen in proportions for achieving total combustion.

Claim 15 (Previously Presented): Process according to Claim 3, wherein said reaction gas mixture or a product thereof successively encounters said first inert porous material, said catalytic bed and said second inert porous material within a reactor comprising the following arrangement:

- a first cylinder comprising, at its lower end, means for introducing said reaction gas mixture;
- a second cylinder of smaller diameter than said first cylinder, inserted into said first cylinder so that its upper end is situated at a distance from the upper end of the first cylinder and so that its lower end, via which the mixture comprising the hydrogen and the CO is collected, emerges outside the first cylinder;
- said first inert porous material filling at least a portion of the height of the annular space defined by the internal wall of the first cylinder and the external wall of the second cylinder;
- said catalytic bed filling the upper part of the first cylinder and/or that of the second cylinder;
- said second inert porous material filling the lower part of the second cylinder.

Claim 16 (Previously Presented): Process according to Claim 15, wherein the preheating of said porous medium is carried out using electrical elements situated at the periphery of the reactor.

Claim 17 (Previously Presented): Process according to Claim 15, wherein the preheating of said porous medium is carried out by circulating therein, prior to said introduction of the reaction mixture, a preheating gas mixture comprising a hydrocarbon and oxygen in proportions for achieving total combustion.

Claim 18 (Previously Presented): Process according to claim 1, wherein during continuous operation of the process, the porous medium is not heated by an external heat supply.

Claim 19 (Previously Presented): Process according to claim 1, wherein the entire flow of the reaction gas mixture is introduced into the porous medium.

Claim 20 (Currently Amended): Process for the production of a mixture comprising hydrogen and CO, comprising partially oxidizing a hydrocarbon by an oxygenated medium or a medium capable of releasing oxygen, wherein the process is carried out under autothermal conditions, the heat given off by said oxidation being recovered to maintain the endothermic reactions which take place between a nonoxidized fraction of said hydrocarbon and CO₂ and steam produced by said oxidation, wherein

a flow of a reaction gas mixture comprising the hydrocarbon and the oxygenated medium or medium capable of releasing oxygen, is introduced into a reactor containing a porous medium which has been preheated beforehand, and wherein

the introduction of the reaction gas mixture into the porous medium results in heating the reaction gas mixture by heat exchange with the porous medium to a temperature sufficient to initiate a combustion reaction, and wherein

the entire flow of the reaction gas mixture is introduced into the porous medium, and
wherein

said preheated porous medium is formed by a first inert porous material and wherein
the reaction gas mixture or a product thereof successively encounters said first inert porous
material, a catalytic bed and then a second inert porous material within a vertical cylindrical

reactor, the ends of which are filled with one or other of said inert porous materials and the central part of which is filled with said catalytic bed, the process further comprising alternately feeding the reactor containing the porous medium with the reaction gas mixture by the following introduction modes (i) and (ii):

(i) the reaction gas mixture is introduced to a lower part of the reactor and the mixture comprising the hydrogen and the CO is collected at an upper part of the reactor, or

(ii) the reaction gas mixture is introduced to the upper part of the reactor and the mixture comprising the hydrogen and the CO is collected at the lower part of the reactor,

wherein the introduction modes (i) and (ii) alternate as a function of the advance of a combustion front inside the reactor.

Claim 21 (Canceled)